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Manufacturing Technology (Interdisciplinary)

CTE NARRATIVE TEMPLATE for a (credit) Certificate of Achievement

SPO2: Program Award	Certificate of Achievement	Faculty Workload (1)	1.725
Program Title	Manufacturing Technology	New Faculty Positions	0
Program Goal	Career Technical Education	New Equipment	0
SP01: Pgm Top Code	095600	New/Remodeled Facilities	0
Required Certificate Unit Minimum	25	Library Acquisitions	0
Required Certificate Units Maximum	25	Program Review Date (2)	May 2015
Annual Completers	10	Gainful Employment	Yes
New Annual Labor Demand (CTE Only)	204	Apprenticeship	No
		Distance Education (3)	5%
		CTE Regional Consortium Approved	PENDING
		District Governing Board Approved	Yes
		District Governing Board Approval Date	January 2014

(1) Faculty load based on number of sections to support program student thru put

(2) Review date within 2 years following the approval of program. CTE must be every two years.

(3) Percent of courses offered in hybrid or distance Ed.

ITEM1: Program Goals and Objectives

The Modesto Junior College Manufacturing Technology (Interdisciplinary) program is designed to provide education and training in a variety of operator, maintenance and repair technician skills for the food processing and manufacturing industry. The program consists of courses identified from existing disciplines in agriculture mechanics, electronics, machining and welding at MJC. These courses will form a new certificate program that will expose students to a common core of maintenance and operation trade skills and theory needed in the manufacturing industry. Successful completion of the program could lead to entry level employment as a

Machine Operator, Line Operator, General Maintenance & Repair Technician, Machine Tender, and/or Maintenance Mechanic. The **Manufacturing Technology Certificate** is consistent with and supports the college's mission of providing programs and services that are informed by the latest scholarship of teaching and learning. These programs and services fulfill a primary mission of the college, career and technical education.

ITEM 2: Catalog Description

The Manufacturing Technology Certificate offers an interdisciplinary approach to meeting the training needs of the food processing and manufacturing industries. To accomplish this goal, selective courses in welding, electronic (and electricity), machine tool, hydraulic and pneumatic technologies make up the 25 unit training platform. The curriculum includes courses which prepare students to complete AWS D-1 certification and Manufacturing Skills Standards Certification (MSSC) assessment levels in safety and quality assurance. The interdisciplinary course approach enables a broad exposure of electrical, mechanical, welding, machine shop, pneumatic and hydraulic concepts. Students who successfully complete this program will earn a state approved certificate of achievement.

PROGRAM LEARNING OUTCOMES

Upon satisfactory completion of this program, the student should be prepared to:

1. Perform the measuring and calculating of voltages, currents, and resistance in circuits and the wiring application of typical industrial equipment.
2. Perform typical machining, grinding, and threading operations within acceptable tolerances of general manufacturing procedures.
3. Demonstrate proper set-up of SMAW, GMAW, and GTAW equipment and perform typical welding procedures according to general manufacturing codes and standards

ITEM 3: Program Requirements

PROGRAM REQUIREMENTS

To earn a Certificate in this major, the student must complete the requirements 25 units below.

AGM 262	Hydraulics/Pneumatics	3
ELTEC 208	The World of Electricity and Electronics	3
ELTEC 229	Commercial & Industrial Wiring	3
ELTEC 265	Troubleshooting Techniques	1
MACH 301	Machine Shop 1	3
MACH 302	Machine Shop 2	3
WELD 200	Arc & Gas Welding	3
WELD 204	Gas Metal Arc Welding(G.M.A.W) & Flux Core Arc Welding (F.C.A.W)	3
WELD 206	Gas Tungsten Arc Welding (G.T.A.W.)	3

Total Units 25

ITEM 4: Master Planning

Food Processing and Manufacturing companies represent a major portion of employment in the Modesto area and the greater San Joaquin Valley. Currently, Modesto Junior College offers training in specific areas of agriculture mechanics, machine tool technology, welding technology, electronic technology and electricity. However, there is an absence of a broader, foundational platform of training that meets the food processing and manufacturing industry needs. As listed below, these skills have been referred to as Tier I and Tier II competencies in the recent Skills Standards for Food Manufacturers: Maintenance Mechanic (2013, Merced College, College of Sequoias, Washington State University Energy Program). This new focus on manufacturing and food processing technologies will offer an interdisciplinary approach for students to develop pathways of training for careers in these areas. In addition, this new program will offer more distinct directions and options for local manufacturers in the area that currently send their entry level employees to Modesto Junior College to be enroll in class across several traditional disciplines, without achieving a certificate or degree.

Pyramid of Competencies

The Pyramid of Competencies is a depiction of skill standards in three broad skill categories.

- **Tier I** represents the broadest level of competencies, and is the set of employability (SCANS) skills, knowledge, abilities and personal qualities required of all workers to be successful in today's workplace. These are the universal skills that are needed to apply technical knowledge and tools effectively.
- **Tier II** represents technical skills, knowledge and abilities common to jobs within a cluster across all industries or industry sectors.
- **Tier III** represents industry-specific technical skills, knowledge and abilities that are unique to individual jobs or clusters and are the most prone to rapid change. For example, many workers need to upgrade their skills based on sudden market shifts.



The MJC Welding Department is the sponsoring instructional program, but the program courses will be taught by instructors from faculty service areas in: agriculture, electronics technology,

machine tool technology and welding. These instructional areas currently are made up of 8 full-time instructors and part-time instructors. The program will be located on the MJC West Campus and rely on the rich history, expertise and capacity of the faculty from the agriculture, electronics, machining and welding disciplines. Presently, there is adequate financial support in place for to support the current program and this proposed new certificate.

MJC faculty maintain an active relationship with local food manufacturing employers and associations primarily located in Stanislaus County. As a group the various college instructors through their respective areas meet with local employers on automation, electrical, machining and maintenance & repair interests. The proposed **Manufacturing Technology (Interdisciplinary) Certificate** as a program brings together the most common knowledge and skill needs required of the most frequently hired entry level employment opportunities such as: machine operators, line operators, general workers, maintenance technicians, etc. and therefore, appropriate to the objectives and conditions of higher education and community college education in California pursuant to Title 5 sections 55130(b) (6) and 55130(b) (7).

The Manufacturing Technology Certificate will operate primarily out of the MJC West Campus: Tenaya Complex, Ansel Adams Building and Sierra Hall Building. Open enrollment will be adhered to through observance of traditional college wide registration and enrollment practice available to all student seeking enrollment into college classes at Modesto Junior College – classes and program information will be published in the catalog and semester schedules for students seeking studies in automotive. No additional student selection criteria are in place; this certificate complies with California Code of Regulations, Title 5, sections 55201 and 58106.

The MJC Career Technical Education, Community Education & Workforce Development Division maintains active communication and employer relationship with local food manufacturing industry. These relationships span “physical processing plants” in fruit, nuts, dairy, poultry, vegetable dehydration and wineries.

Input from local employers validate the need for the cross functional skills the Manufacturing Technology Certificate aims to provide. MJC has a new formed Manufacturing Industry Advisory Committee [[advisory minutes attached](#)]. MJC has also collected information in support for the new Manufacturing Technology Certificate from its participation in local and regional meetings that have included (1) the Merced College/College of Sequoias DSN Food Manufacturing Skills Standard Initiative [[report attached](#)], (2) CSU Fresno San Joaquin Valley Ag Manufacturing Meeting, (3) Manufacturing Council of The Central Valley Advisory Meetings, (4) TAACCT grant college planning sub-meetings for manufacturing and (5) MJC Contract Education Client Meetings: E. & J. Gallo Winery, Gallo Glass, Foster Farms, Frito Lay and Saputo Foods. Finally, the MJC Technical Education Department further evaluated a response to the need based on the analysis of 11 local employer internal training programs presently enrolling their employees in MJC electrical, machining, welding and agricultural mechanic courses, each year.

Manufacturing Industry Advisory Committee:

Sonny Gumm	MJC Welding Instructor
Pedro Mendez	MJC Career Technical Education, Community Education and Workforce Development Dean
Alida Garcia/ Elizabeth Hondoy	MJC Counseling
Jim Howen	MJC Electronics Technology Instructor
Jeff Weaver	MJC Machine Tool Technology Instructor
Keith McCowen	Covanta Energy (Waste Recycle)
Patt Dodds/ Steve Kidd	E. & J Gallo Winery (Winery)
Jim Weaver	Express Pros Placement Services
Mary Anne Henriques	Diamond of California (Nuts)
Doug Van Diepen	Del Monte Foods (Fruit)
Tom Melead/ Garrett Pounds	Frito Lay (Secondary Goods)
Victor Henriquez/ Kristi Marcella	G 3 Enterprise
Lance Lemmings/ John Gallo	Gallo Glass (Bottling)
Chuck Downing	George Pacific (Corrugating/Packaging)
John Coate	Hilmar Cheese (Cheese)
Steve Socrati	ICS Inc. (Systems Installation)
Mark Lopez	Le Prino Foods (Cheese)
Doug Kirpatrick	Morning Star (Tomato)
Blake Stewardt	Pacific Southwest Containers (Packaging)
Doug Meredith	Peninsula Recycling
Dustin Morgan	Plastipak
Maureen Williams/ Bob Apodaca	Saputo Foods (Cheese)
Tom Nett/ Fred Baker	Seneca Foods (Tomato)
Cordell Price/ Gerald Salcido	John B. Sanfilippo & Son, Inc.
Timothy Hartman	Silgan Containers (Canning)
Mike Mahler	US Farm Systems
Jennifer Carlson	Manufacturers Council of the Central Valley
Jeff Rowe/ Dave White	Stanislaus Alliance WorkNet
Chris Vanmeter	Ceres High School - MPGT
Luis Rebolledo	MJC – Student Ambassador Public Safety & Technical Education

ITEM 5: Enrollment and Completer Projections

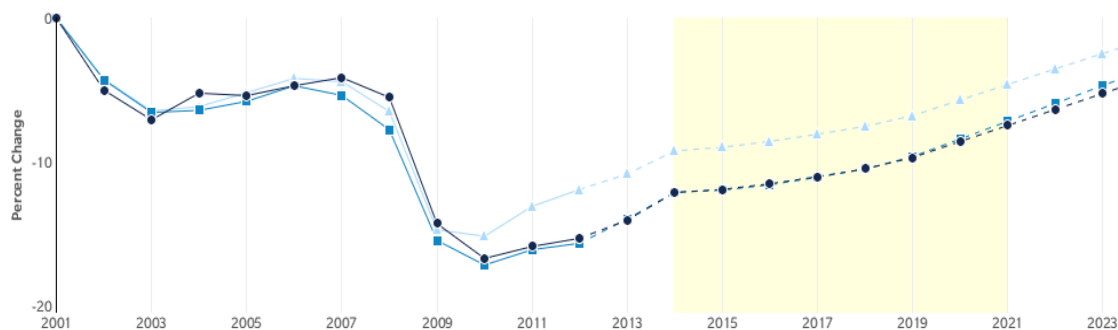
As a new program the MJC estimates certificate enrollment will grow to 100 student enrollees in its program classes within the first two years. The college anticipates the current program will achieve 20 completers by its 2nd year and grow this completion rate through its fifth year of

operation to 25 completers per year. Students will be enrolled into existing courses in agriculture mechanic, electronics, machining and welding.

CBO1: Course	CBO2: Course Title	YEAR 1		YEAR 2	
		Annual Sections	Annual Enrollment	Annual Sections	Annual Enrollment
AGM 262	Hydraulics/Pneumatics	1	10	1	20
ELTEC 208	The World of Electricity and Electronics	2	40	3	72
ELTEC 229	Commercial & Industrial Wiring	1	10	1	20
ELTEC 265	Troubleshooting Techniques	2	20	2	40
MACH 301	Machine Shop 1	2	10	2	30
MACH 302	Machine Shop 2	1	10	1	20
WELD 200	Arc & Gas Welding	2	40	3	60
WELD 204	Gas Metal Arc Welding(G.M.A.W) & Flux Core Arc Welding (F.C.A.W)	1	20	2	40
WELD 206	Gas Tungsten Arc Welding (G.T.A.W.)	1	20	2	40

Career Technical Education – Labor Review: Labor Market Information has been evaluated. The EMSI economic analysis of data includes local, sub-region, central region and state level data [study attached]. In all sets of data, trends have indicated a steady need for local and region occupation professionals. Specifically, the data illustrated below projects 1,638 jobs between 2014 and 2021 (an average of 204 jobs annually) a 5.3% growth in related occupations. The employment range for the associated 21 occupations are listed between \$15.00/hr. and \$24.26/hr. Further analysis shows that in 2013, there were 1,313 openings but only 97 completers in the region, from related programs. The analysis indicates a strong need for programs that can fill this need.

Regional Trends



Region	2014 Jobs	2021 Jobs	% Change
● Region (Stan, SJoaq., Merced & Mother Lode)	30,936	32,575	5.3%

	Region	2014 Jobs	2021 Jobs	% Change
●	State	364,904	385,438	5.6%
●	Nation	3,918,513	4,117,793	5.1%

** Occupational Overview: 21 Occupations in the Valley Sierra Consortia Region (MJC Manufacturing Technology – Interdisciplinary). EMSI: Economic Modeling Specialists International. Report produced by P Mendez in summer 2014.

ITEM 6: Place of Program in Curriculum/Similar Programs

The Manufacturing Technology Certificate will provide an opportunity to offer a new certificate that responds to cross functional technical skills required by the majority of local manufacturing employers for entry level worker, operators and maintenance positions. At present there are not similar programs found at Modesto Junior College. The current programs focus on specific single focus skill development such as Industrial Electronics, MIG & TIG, CNC Operation, or Machine Tool Technology manual equipment. The gap these programs have is that they do not expose students to related trade skills and technology. These specialized programs are appropriate if the student has 3-5 years of related experience in industry. The Manufacturing Technology Certificate is specifically design to target students lacking the experience in industry and seeking a broad set of skills to begin their careers as operators, technicians and entry level maintenance personnel. The program is a better option for students seeking employment in the industry who have limited experience working in physical plants.

ITEM 7: Similar Programs at Other Colleges in Service Area

The Manufacturing Technology Certificate is unique in manufacturing programs designed in the state community college system. Typically, programs focus on a selected study such as industrial mechanics, electrical or machining. In the Central Mother Lode region there seems to be only a handful of programs that truly blend disciplines to address sufficient theory and applied learning around electrical practices, mechanical concepts, welding, machine shop training and pneumatic and hydraulics training. The program design resembles work by Reedley College which also seemingly draws from multiple disciplines.